

**DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMITTING and COMPLIANCE DIVISION
MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM
(MPDES)**

Statement of Basis

Permittee:	City of Harlem
Permit No.:	MT0000931
Receiving Water:	Milk River
Facility Information:	
Name	City of Harlem Water Treatment Plant
Location	990 Water Plant Road, T32N, R 23E, Section 30, Blaine Co.
Facility Contact:	Donald Coffman, Water Plant Supervisor P.O Box 579 Harlem, MT 59526 (406) 353-2836
Fee Information:	
Number of Outfalls	1
Outfall – Type	001-Process Water

I. Permit Status

This permit is a renewal Montana Pollutant Discharge Elimination System (MPDES) permit for the City of Harlem's domestic drinking water filtration plant. The current permit was issued September 1, 1998 and expired April 30, 2003. The permittee submitted fees and a renewal application on November 23, 2002. A final review of the application was completed by the Department of Environmental Quality (Department) on April 26, 2006.

As directed by the Administrative Rules of Montana (ARM) 17.30.1322(4)(a), because the permittee has submitted a complete renewal application, the current permit is administratively extended until a new permit is issued.

The original permit was issued by the US EPA, effective April 30, 1974, for a facility that regularly discharged filter backwash water to the Milk River. The permit contained a compliance schedule requiring that the facility meet total dissolved aluminum limits by July 1, 1976. The permittee reconfigured the backwash water piping to discharge into its primary settling basins to avoid discharges. A discharge from the facility to the Milk River has not been reported since 1976. Piping is present and maintained to allow a discharge directly from the filters to the Milk River.

II. Facility Information

The City of Harlem uses conventional water treatment to treat Milk River water for its municipal water supply. River water is diverted and stored in unlined earthen primary settling basins. The treatment process includes coagulation, flocculation, sedimentation and filtration to remove suspended solids and other pollutants from raw water. The permittee adds aluminum sulfate ($\text{Al}_2(\text{SO}_4)_3$), as a coagulant.

Normal operation directs all wastewater produced during filter backwash to the primary settling basins. The permittee maintains the MPDES permit for an atypical situation that would require direct backwash wastewater discharge to the Milk River. Such a discharge would be directly from the filters to the Milk River. No storage or primary settling would occur if the permittee opted to discharge to the Milk River. Discharge would be controlled by opening a flap valve at the river pump (Figure 1). The discharge would consist solely of filter backwash water and would not contain water from the primary settling basins.

Filter backwash occurs as needed based on ambient river turbidity, at least once per week. Backwash frequency increases during the late spring through summer due to source water turbidity. Treated chlorinated water from the wet well is used to backwash the filters.

The permittee is planning upgrades to the water treatment plant and is scheduled to begin the design phase in July 2007. A portion of the upgrades will establish separate settling basins for the backwash wastewater and eliminate the backwash discharge into settling ponds. The construction of backwash water settling ponds is tentatively scheduled to begin in late 2008. The contract engineer projects that more frequent discharges of backwash water to the Milk River are likely to occur after the upgrades.

Effluent Characteristics

The permittee did not report a discharge during the previous permit cycle. The previous permit had limits for total suspended solids (TSS) and total dissolved aluminum. Required monitoring parameters for a discharge are flow rate, total dissolved aluminum, TSS, total residual chlorine, and pH.

III. Rationale for Proposed Technology-Based Effluent Limits

Technology-based effluent limits (TBELs) represent the minimum level of control that must be imposed by a permit issued under the MDPES program, as stated at 40 CFR 125.44 (a) and adopted by reference in ARM 17.30.1344(2)(b). The Department must consider technology available to treat wastewater and limits that can be consistently achieved by that technology. Technology-based effluent limits are based on currently available treatment technologies and allow the permittee the discretion to choose applicable controls to meet those standards.

Effluent limit guidelines (ELGs) have not been promulgated for drinking water treatment facilities.

The previous permit had the following limits for TSS:

30-day Average TSS:	30 mg/L
Daily Maximum TSS:	45 mg/L

These TSS effluent levels are equivalent to secondary treatment limits for municipal lagoons [40 Code of Federal Regulations (CFR) Part 133.102] and are demonstrated to be consistently achievable in the water treatment industry. Settling basins can effectively reduce TSS and turbidity from surface water at a low cost.

Load limits for an industrial discharge are calculated using a reasonable measure of actual production of the facility (ARM 17.30.1345(2)(b)(i)). The permittee supplied the Department with actual monthly backwash volume from March 2006 through February 2007. The average backwash production rate was 321,069 gallons per month, which is equivalent to 10,702 gallons per day (gpd) based on a 30-day month. Load limits are calculated as follows:

Average Production Flow (mgd) x Concentration Limit (mg/L) x 8.34 = Load (lb/day)

30-day Average TSS load:	$0.0107 \text{ mgd} * 30 \text{ mg/L} * 8.34 =$	2.7 lb/day
Daily Maximum TSS load:	$0.0107 \text{ mgd} * 45 \text{ mg/L} * 8.34 =$	4.0 lb/day

At this time, a wastewater discharge from the filtration plant to the Milk River would not meet the proposed TSS limits because the facility does not offer settling prior to discharge.

The addition of settling ponds or basins through the planned facility upgrades will offer treatment to meet the proposed TSS limits.

Nondegradation Load Allocations – The provisions of ARM 17.30.701, *et seq.* (Nondegradation of Water Quality) apply to new or increased sources of pollution [ARM 17.30.702(18)]. Because it existed and was permitted before April 29, 1993, the Harlem Water Treatment plant discharge does not constitute a new or increased source for the purposes of Montana Nondegradation requirements. Sources that are in compliance with the conditions of their permit and do not exceed the limits established in the permit, or as determined from a permit previously issued by the Department, are not considered new or increased sources.

The Department did not calculate TBEL nondegradation baseline load allocations for the previous permit. The statement of basis for the previous permit states that “because this permit existed prior to the effective date of the Montana’s Nondegradation Rule, a review is not required”.

For the permit renewal, the Department used actual flow data from the City of Harlem from the period before April 29, 1993 in the calculation of a TSS nondegradation baseline load allocation. For the year defined as May 1992 to April 1993, the maximum periods of backwash occurred in July and August. The values for July and August were 278,890 and 433,920 gallons per month, respectively. These two values are averaged and divided by 31 days, the number of days in each month, and the resultant is 13,110 gpd. This rate is used to calculate the baseline load allocation as follows:

Load (lbs/day) = Ave. production flow (mgd) x 30-day Ave. concentration limit (mg/l) x 8.34

TSS Nondegradation Baseline Load Allocation:

$$30\text{-day TSS} = 0.0131 \text{ mgd} \times 30 \times 8.34 = 3.3 \text{ lbs TSS/day}$$

IV. Rationale for Proposed Water Quality-Based Effluent Limits

A. Scope and Authority

Permits are required to include water quality-based effluent limits (WQBEL) when technology-based effluent limits are not adequate to protect state water quality standards (40 CFR 122.44 and ARM 17.30.1344). ARM 17.30.637(2) states that no wastes may be discharged that can reasonably be expected to violate any state water quality standards. Montana water quality standards (ARM 17.30.601-670) define both water use classifications for all state waters and numeric and narrative standards that protect those designated uses. New sources, as defined in ARM 17.30.702(18), are subject to Montana Nondegradation Policy (75-5-303, MCA) and regulations (ARM 17.30.701-718).

B. Receiving Water

The receiving water, the Milk River, is classified as B-3 according to Montana Water Use Classifications, ARM 17.30.610 (1)(h). Waters classified B-3 are to be maintained suitable

for drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply (ARM 17.30.625).

The discharge location is in the 10050004 4th field HUC (hydraulic unit code), as defined by the United States Geological Survey (USGS). The discharge is to the reach of the Milk River identified by Montana stream segment MT40J001_010, defined as the reach from Fresno Dam to Whitewater Creek.

The USGS maintains a flow monitoring station on the Milk River located downstream of Fort Belknap (Station 06154100). The 7-day 10-year low flow (7Q10) for this station is 3.7 cubic feet per second (cfs; USGS, 2004). ARM 17.30.635(4) requires that the design condition for disposal systems must be based on the 7Q10. The previous permit used a 7Q10 of 6.541 cfs based on data from the same station. The lower 7Q10 will be used for permit limit derivation in this permit because it reflects the most recently collected flow data (period of record used: October 1959 to September 1969, October 1982 to September 2002).

The Milk River in the vicinity of the discharge is listed on the 1996 and 2006 303(d) lists of impaired streams. Beneficial uses identified as impaired on the 1996 list are aquatic life, warm water fishery, and drinking water. Causes of impairment were identified as other organics, nutrients, salinity/TDS/chlorides, flow alteration, other habitat alteration and suspended solids. Probable sources of impairment included municipal point sources.

The 2006 303(d) list identifies the Milk River as not supporting drinking water uses and fully supporting its agricultural and industrial beneficial uses. Aquatic life, warm water fishery, and contact recreation were not assessed. The probable cause of impairment is mercury and the probable sources are agriculture, dam or impoundment(s), and natural sources.

To date, a total maximum daily load (TMDL) has not been prepared for the Milk River.

C. Mixing Zone

A mixing zone is an area where the effluent mixes with the receiving water and certain water quality standards may be exceeded [ARM 17.30.502(6)]. The Department must determine the applicability of currently granted mixing zones [ARM 17.30.505(1)]. Mixing zones allowed under a permit issued prior to April 29, 1993 will remain in effect unless there is evidence that previously allowed mixing zones will impair existing or anticipated uses [ARM 17.30.505(1)(c)].

Acute standards for any parameter may not be exceeded in any portion of the mixing zone unless the Department specifically finds that allowing minimal initial dilution will not threaten or impair existing beneficial uses (ARM 17.30.507(1)(b)).

For the previous permit, the Department defined the mixing zone as extending downgradient to approximately one mile downstream of the discharge outfall to a point defined as SE 1/4 , SW 1/4, SW 1/4 of Section 30, Township 32N, Range 23 E, Blaine County (latitude: 48° 29'

48"N, longitude: 108° 47' 47" W). This boundary was determined using best professional judgment.

The volume available in a standard mixing zone is based on the dilution ratio between the 7Q10 and the discharge rate of the facility. One-hundred percent of the receiving water flow is used in mixing calculations for a facility that discharges a mean annual flow of less than one million gallons per day to a stream segment with a dilution ratio greater than or equal to 100:1. Based on 2006-2007 production data, the average production rate is 10,702 gpd or 0.017 cfs. The dilution ratio is 217 (3.7 cfs/0.017 cfs).

The discharge pipe terminates in the middle of the Milk River channel (conversation with D. Coffman, operator, March 8, 2007). The pipe is always submerged and is also used to withdraw water to the primary settling basins. This discharge location should provide adequate mixing of the wastewater with the receiving water.

This permit will not use mixing for permit limit derivation. The permittee did not request a mixing zone. Future permit limits may require a mixing zone and/or mixing zone analysis.

D. Applicable Water Quality Standards and Proposed WQBEL/WLA

Discharges to surface waters classified B-3 are subject to the specific water quality standards of ARM 17.30.625 (March 31, 2006), Department Circular DEQ-7 (February 2006), as well as the general provision of ARM 17.30.635 through 637. In addition to these standards, dischargers are also subject to ARM 17.30 Subchapter 5 (Mixing Zones, November 2004) and Subchapter 7 (Nondegradation of Water Quality, June 30, 2004).

Pollutants typically present at potable water treatment plants that may cause or contribute to a violation of water quality standards include conventional pollutants such as TSS and pH, non-conventional pollutants such as turbidity, and toxics such as chlorine and aluminum.

Effluent limits are required for all pollutants which demonstrate a reasonable potential to exceed numeric or narrative standards. The Department uses a mass balance equation to determine reasonable potential based on *EPA Technical Support Document for Water Quality based Toxics Control (TSD) (EPA/505/2-90-001)*. Input parameters are based on receiving water concentration, maximum projected effluent concentration and design flow of the wastewater treatment facility, and the applicable receiving water flow.

1. Conventional Pollutants

Total Suspended Solids - TBELs identified in Part III are sufficient to reduce the suspended solids and will apply to the discharge. No additional WQBEL will be required for this parameter.

2. Non-conventional Pollutants

Turbidity - The maximum increase above naturally occurring turbidity in this permit is 10 nephelometric turbidity units (NTU) [ARM 17.30.624(2)(d)]. TBELs identified in Part III are adequate to control turbidity levels in the wastewater. No additional WQBEL are required for this parameter.

3. Toxic Pollutants

Total Residual Chlorine (TRC) – The TRC limit in the previous permit is 0.5 mg/L. This concentration exceeds the acute water quality standard of 0.019 mg/L and the chronic water quality standard of 0.011 mg/L. The TRC daily maximum limit in this permit is 0.019 mg/L; the TRC average monthly limit is 0.011 mg/L. Analytical methods in 40 CFR Part 136 requires chlorine samples to be analyzed immediately. On-site sampling for total residual chlorine with a chlorine meter using an approved method is required.

Dissolved Aluminum – Effluent data does not exist for the discharge. Ambient dissolved aluminum data are non-existent for the Milk River near Harlem. Reasonable potential is assumed to exist because, at present, the facility does not offer wastewater treatment. Dissolved aluminum effluent limits have been included in past MPDES permits. Past permit statements of basis cite Best Professional Judgment (BPJ) as the rationale used for dissolved aluminum limits. The previous permit dissolved aluminum effluent limits were 1.0 and 1.5 mg/L for the 30-day and daily maximum limits, respectively.

Dissolved aluminum is a toxic parameter (DEQ-7, February 2006) and limits are applicable to surface waters with a pH between 6.5 and 9.0 s.u. The acute standard is 0.750 mg/L and the chronic standard is 0.087 mg/L. The standards are the limits applicable at the end of the treatment prior to discharge.

V. Final Effluent Limits

A. Final Limits

Proposed Final Effluent Limits			
Parameter	Units	Average Monthly Limit ¹	Maximum Daily Limit ¹
Total Suspended Solids (TSS)	mg/L	30	45
	lbs/day	2.7	4.0
Total Residual Chlorine	mg/L	0.011	0.019
Dissolved Aluminum	mg/L	0.087	0.750
Footnotes: 1. See Definition section at end of permit for explanation of terms.			

Effluent pH shall remain between 6.0 and 9.0. For compliance purposes, any single analysis and/or measurement beyond this limitation shall be considered a violation of the conditions of this permit [ARM 17.30 647(2)(c)].

There shall be no discharge of floating solids or visible foam in other than trace amounts [ARM 17.30 647(1)(b)].

There shall be no discharge which causes visible oil sheen in the receiving water [ARM 17.30 647(1)(b)].

VI. Monitoring Requirements

Monitoring Requirements				
Parameter	Unit	Monitoring Location	Frequency of Analyses	Sample Type
Flow	mgd	Effluent	Continuous	Instantaneous
Duration	days	Effluent	Reported	None
TSS	mg/L	Effluent	1/Week	Grab
	lbs/day	Effluent	1/Month	Calculated
Dissolved Aluminum	mg/L	Effluent	1/Week	Grab
pH	s.u.	Effluent	1/Week	Instantaneous
Total Residual Chlorine	mg/L	Effluent	Daily	Grab

VII. Special Conditions/Compliance Schedules

None at this time.

VIII. Other Information

On September 21, 2000, a US District Judge issued an order stating that until all necessary total maximum daily loads (TMDLs) under Section 303(d) of the Clean Water Act are established for a particular water quality limited segment, the State is not to issue any new permits or increase permitted discharges under the MPDES program. The order was issued under the lawsuit Friends of the Wild Swan vs. US EPA et al, CV 97-35-M-DWM, District of Montana, Missoula Division.

The renewal of this permit does not conflict with Judge Molloy's order because the permitted discharge does not represent a new or increased source of pollutants under the MPDES program.

IX. Information Source

40 CFR, Parts 122, 136, July 1, 2000.

DEQ. Circular WQB-7, Montana Numeric Water Quality Standards. February 2006.

DEQ. ARM (Administrative Rules of Montana) 17.30.601-670. Montana Surface Water Quality Standards. February 2006.

DEQ. ARM 17.30.701-717. Nondegradation of Water Quality. June 2004.

DEQ. ARM 17.30.1201-1209, 17.30.1301-1387. Montana Pollutant Discharge Elimination System (MPDES). March 2003.

DEQ. 2006 Montana Integrated Water Quality Report. 2006.

EPA. Office of Water. Design Manual for Municipal Wastewater Stabilization Ponds, EPA 625-1-83-015. October 1983.

EPA. Technical Support Document for Water Quality-Based Toxics Control (TSD), EPA/505/2-30-001. March 1991.

MCA (Montana Code Annotated), Title 75-5-101 *et seq.*, "Montana Water Quality Act". 2003.

SAIC (Science Applications International Corporation), *Model Permit Package - Water Supply Industry*. Commissioned by the Environmental Protection Agency January 30, 1987.

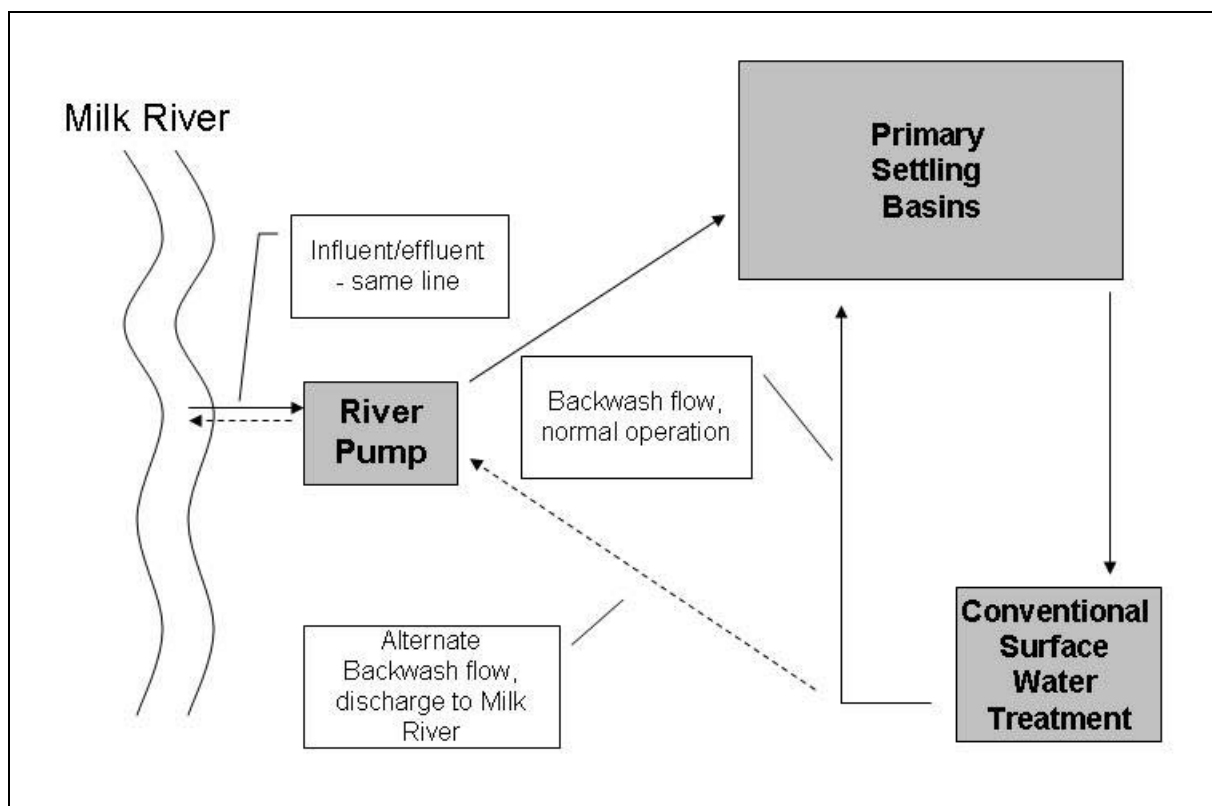


Figure 1: Flow diagram for water treatment plant.